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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,421	03/02/2004	Dilip M. Shah	67,097-025; EH-10985	3769
26096 7590 03/09/2007 CARLSON, GASKEY & OLDS, P.C. 400 WEST MAPLE ROAD SUITE 350 BIRMINGHAM, MI 48009			EXAMINER WIEHE, NATHANIEL EDWARD	
			ART UNIT	PAPER NUMBER
			3745	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/09/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/791,421

Applicant(s)

SHAH ET AL.

Examiner

Nathan Wiehe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-15 and 17-30 is/are pending in the application.
- 4a) Of the above claim(s) 3, 6-10, 14 and 17-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5, 11-13, 15 and 22-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 20 November 2006 have been fully considered but they are not persuasive. Applicant has argued that Kington does not disclose the composition as currently claimed. However, Kington discloses the use of SC180 alloy, which has a chemical composition, as evidenced by Wilson (4,921,405) within the values claimed. Further, the new limitation is deemed to be indefinite since it is not clear what chemical composition is required by the claim, See 112 rejection below.

The amendment to claim 12 has overcome the previous 112 rejection of the claim.

Applicant's arguments, see page 9, filed 20 November 2006, with respect to the rejection(s) of claim(s) 11 and 22 under 102 and 103, respectfully have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Gell et al. (4,116,723).

Drawings

The drawings were received on 20 November 2006. These drawings are accepted.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claims 1,2,5,11-13,15 and 22-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly added limitation "and at least one element selected from..." is deemed to be new matter. The original disclosure did not require at least one of the elements to be present in the material; instead it required a given percentage range, that included zero, of the specific elements to be present. Therefore, none of the elements were explicitly required to be contained in the material. This limitation constitutes new matter since it was not evident, at the time the application was filed, to one skilled in the relevant art that the inventor(s) were in possession of a material requiring at least one of the specified elements.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1,2,5,11-13,15 and 22-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1,12,23 and 29 include the limitation of "and at least one element selected from up to 2% Ti, up to 2% Nb, up to 1% V, up to 10% (Ru+Rh+Pd+Os+Ir+Pt), and up to 0.25% Y". The limitation is indefinite since the term "up to" can include 0% and therefore selecting at least one of can be interpreted as

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selecting 0% of any one of the elements. Claims 2,5,11,13,15,22,24-28 and 30 are indefinite due to their dependence from claims 1,12,23 and 29, respectively.

Claim 5 is additionally indefinite since the element percentages do not add up to 100%. It is believed that applicant did not intend to delete the statement “, and the balance Ni”

Claims 15 and 25 are additionally indefinite since they do not further limit their parent claims. Independent claims 12 and 23, respectively, establish that the base metal as Ni.

Claim 30 is additionally indefinite since the element percentages do not add up to 100%. It is believed that applicant did intend to include “, and the balance Ni” at the end of the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,2,23-25,28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Kington (5,292,385). Note the high modulus turbine blade 26 comprising a base portion and a tip portion, a primary direction near 30 that extends from the base portion to the tip portion, and the turbine blade being formed of a base metal that has a crystallographic orientation <010>, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary

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direction. The high modulus direction is aligned to within a cone of about ten degrees of the primary direction. The base metal is a Ni base alloy. Also disclosed is a method of tuning the natural vibration frequency of the turbine blade, comprising the step of increasing the elastic modulus in the primary direction of the turbine blade, with the primary direction being a direction that extends from the base to the tip. The material of Kington is disclosed to be SC180 (Kington column 6, lines 63-65), which is known to have a chemical composition of 10% Co, 5% Cr, 1.7% Mo, 5% W, 8.5% Ta, 5.5% Al, 3% Re, 0.8% Ti, 0.1% Hf and balance Ni.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duhl et al. (4,719,080), hereinafter "Duhl" in view of Kington (5,292,385). Duhl disclose a turbine blade constructed of a supper alloy having a chemical composition of 4.0-7.5% Cr, 8-12% Co, 0.5-2.5 Mo, 3.5-7.5% W, 2.5-4% Re, 5-6% Al, 8-10% Ta, 0.1-0.5% Hf, and the balance Ni (Duhl Table 1). It is noted that this material is commonly refereed to by the name PWA 1484. Duhl's blade is constructed as a single crystal. Duhl does not disclose orienting the crystallographic in a high modulus direction so as to be aligned with the primary direction of the blade. Kington discloses a turbine blade being formed of a base metal that has a crystallographic orientation $\langle 010 \rangle$, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary direction. The alignment of Kington provides for low creep

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rates and prolonged stress rupture lives (Kington column 2, lines 43-50). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blade of Duhl by aligning the high modulus crystallographic orientation with the primary direction of the blade, as taught by Kington for the purpose of providing low creep rates and prolonged stress rupture lives.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kington (5,292,385) in view of Gell et al. (4,116,723), hereinafter "Gell". Kington disclose the invention substantially as claimed except for the presence of recrystallized grains. Gell disclose a method of forming and heat treating single crystal articles made of nickel base alloys that recrystallizes their grains. The method of Gell provides articles to exhibit temperature capabilities, for equal mechanical properties, which are at least 30° F greater than the temperature capabilities of comparable prior art single crystal articles (Gell column 3, lines 55-65). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blade of Kington by using a heat treatment process, forming recrystallized grains, as taught by Gell so that the blade experiences comparable mechanical properties at higher temperatures than non heat treated single crystal blades.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kington (5,292,385) in view of Shah et al. (4,915,907), hereinafter "Shah". Kington disclose the invention substantially as claimed except for the aligning the high modulus direction within about ten degrees of the <111> crystallographic direction. Shah discloses a blade including a crystallographic axis such as <111>, which has a high modulus of

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elasticity partially or substantially, aligned with the blade longitudinal axis providing a stiffer blade with desirable resonant frequency characteristics (Shah column 5, line 32-column 6, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blade of Kington by substantially aligning the high modulus direction with the crystallographic axis $\langle 111 \rangle$ for the purpose of providing a stiffer blade with desirable resonant frequency characteristics.

Claims 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kington (5,292,385) in view of Howald et al. (3,572,733), hereinafter "Howald". Kington discloses an aircraft engine substantially as claimed, comprising a compressor, a combustor in fluid communication with the compressor, and a turbine in fluid communication with the combustor (column 1, lines 6-16). A high modulus turbine blade 26 is provided, comprising a base portion and a tip portion, a primary direction near 30 that extends from the base portion to the tip portion, and the turbine blade being formed of a base metal that has a crystallographic orientation $\langle 010 \rangle$, the crystallographic orientation having a high modulus direction, wherein the high modulus direction is aligned with the primary direction. The high modulus direction is aligned to within a cone of about ten degrees of the primary direction. The base metal is a Ni base alloy. However, Kington does not disclose that the aircraft engine comprises a fan with the compressor at least in partial fluid communication with the fan. Howald shows an aircraft engine, having a fan 20 and a compressor 24, with the compressor at least in partial fluid communication with the fan, a combustor 26 in fluid communication with the compressor, and a turbine 16 in fluid communication with the combustor, for the

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purpose of pressurizing an air stream for sucking into the engine. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the aircraft engine of Kington with a fan with the compressor at least in partial fluid communication with the fan, as taught by Howald, for the purpose of pressurizing an air stream for sucking into the engine.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kington (5,292,385) in view of Howald et al. (3,572,733), hereinafter "Howald" as applied to claim 12 above, and further in view of Gell et al. (4,116,723), hereinafter "Gell". The modified invention of Kington discloses the invention substantially as claimed except for the presence of recrystallized grains. Gell disclose a method of forming and heat treating single crystal articles made of nickel base alloys that recrystallizes their grains. The method of Gell provides articles to exhibit temperature capabilities, for equal mechanical properties, which are at least 30° F greater than the temperature capabilities of comparable prior art single crystal articles (Gell column 3, lines 55-65). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the blade of Kington by using a heat treatment process, forming recrystallized grains, as taught by Gell so that the blade experiences comparable mechanical properties at higher temperatures than non heat treated single crystal blades.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kington (5,292,385) in view of Howald et al. (3,572,733), hereinafter "Howald" as applied to claim 12 above, and further in view of Shah et al. (4,915,907), hereinafter "Shah". The

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modified invention of Kington discloses the invention substantially as claimed except for the aligning the high modulus direction within about ten degrees of the $\langle 111 \rangle$ crystallographic direction. Shah discloses a blade including a crystallographic axis such as $\langle 111 \rangle$, which has a high modulus of elasticity partially or substantially, aligned with the blade longitudinal axis providing a stiffer blade with desirable resonant frequency characteristics (Shah column 5, line 32-column 6, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the blade of Kington by substantially aligning the high modulus direction with the crystallographic axis $\langle 111 \rangle$ for the purpose of providing a stiffer blade with desirable resonant frequency characteristics.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patent issued to Wilson is cited to as evidence of the known chemical composition of SC180 (Wilson column 5, lines 60-63).

Conclusion

Although claim 30 has not been rejected by art, patentability is reserved pursuant to applicant's response to the above 112 rejections.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

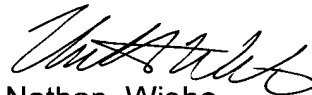
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Wiehe whose telephone number is (571)272-8648. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571)272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Nathan Wiehe
Examiner
Art Unit 3745



EDWARD K. LOOK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700

3/3/07